We Claim:

1. A near infrared radiation chemical imaging system comprising:

a) an illumination source for illuminating an area of a sample using light in the near infrared radiation wavelength;

b) a device for collecting a spectrum of near infrared wavelength radiation light transmitted, reflected, emitted or scattered from said illuminated area of said sample and producing a collimated beam therefrom;

c) a near infrared imaging spectrometer for selecting a near infrared radiation image of said collimated beam; and

d) a detector for collecting said filtered near infrared images

2. The system of claim 1 wherein said illumination source is one of a quartz tungsten halogen lamp, a tunable laser, a metal halide lamp, and a xenon arc lamp.

3. The system of claim 1 wherein said device for collecting is one of a refractive type infinity-corrected near infrared optimized microscope objective, a refractive fixed tube length microscope objective, and a reflecting microscope objective.

4. The system of claim 1 wherein said near infrared imaging spectrometer is selected from the group consisting of Lyot liquid crystal tunable filters; Evans Split-Element liquid crystal tunable filters; Solc liquid crystal tunable filters; Ferroelectric liquid crystal tunable filters; Liquid crystal Fabry Perot filters; a hybrid filter formed from a combination of liquid crystal tunable filters; and a combination of a liquid crystal tunable filter and a fixed bandpass and bandreject filters.

5. The system of claim 1 wherein said detector is a near infrared radiation focal plane array detector.

6. The system of claim 5 wherein said detector is selected from the group consisting of indium gallium arsenide, platinum silicide, indium antimonide, palladium silicide, indium germanide, and mercury cadmium telluride.

7. The system of claim 1 further comprising a visible wavelength imagery system.

8. The system of claim 7 wherein said visible imagery system comprises:

a) an illumination source for illuminating an area of said sample using light in the visible optical wavelengths; and

b) a device for detecting said visible wavelength light from said illuminated area of said sample.

9. The system of claim 8 wherein said device for detecting said visible wavelength light comprises an analog and digital detector based on at least one of a silicon charge-coupled device detector and a silicon CMOS detectors.

10. The system of claim 8 further comprising a processor for producing a near infrared radiation chemical image of said sample.

11. The system of claim 8 further comprising an algorithm for combining the near infrared and visible image data.

12. A chemical imaging system comprising a near infrared imaging detection system and a visible imagery system.

13. The chemical imaging system of claim 12 wherein said near infrared imaging detection system comprises:

a) an illumination source for illuminating an area of a sample using light in the near infrared radiation wavelength;

b) a device for collecting a spectrum of near infrared wavelength radiation light transmitted, reflected, emitted or scattered from said illuminated area of said sample and producing a collimated beam therefrom;

c) a near infrared imaging spectrometer for selecting a near infrared radiation image of said collimated beam; and

d) detector for collecting said filtered near infrared images.

e) an algorithm for processing the near infrared and visible image data.

14. The chemical imaging system of claim 12 wherein said visible imagery system comprises:

a) an illumination source for illuminating an area of said sample using light in the visible wavelength; and

b) a device for detecting said visible wavelength light from said illuminated area of said sample.

15. A chemical imaging system comprising:

a) an illumination source for illuminating an area of a sample using light in the near infrared radiation wavelength and light in the visible wavelength;

b) a device for collecting a spectrum of near infrared wavelength radiation light transmitted, reflected, emitted or scattered from said illuminated area of said sample and producing a collimated beam therefrom;

c) a near infrared imaging spectrometer for selecting a near infrared radiation image of said collimated beam;

d) detector for collecting said filtered near infrared images; and

e) a device for detecting said visible wavelength light from said illuminated area of said sample.

16. A chemical imaging method comprising the steps of:

a) illuminating an area of a sample using light in the near infrared radiation wavelength and light in the visible wavelength;

b) collecting a spectrum of near infrared wavelength radiation light transmitted, reflected, emitted or scattered from said illuminated area of said sample and producing a collimated beam therefrom;

c) filtering said collimated beam to produce a near infrared radiation image of said collimated beam while simultaneously detecting said optical wavelength light from said illuminated area of said sample;

d) collecting said filtered near infrared images; and

e) processing said collected near infrared images to produce a chemical image of said sample.

17. A method for producing a volumetric image of a sample comprising the steps of:

a) moving said sample through an objective;

b) collecting images of said sample through said objective in a plurality of focus depths; and

c) processing said collected images to reconstruct an image of said sample.

18. A method for producing a volumetric image of a sample comprising the steps of:

a) incorporating a refractive image formation optic exhibiting a chromatic response in the optical path of the microscope before the near infrared detector;

b) collecting images of said sample at a plurality of near infrared wavelengths through said objective at a fixed focus condition; and

c) processing said collected images to reconstruct a depth resolved image of said sample.

19. A method for chemically analyzing a sample comprising the steps of:

a) seeding said sample with a plurality of analytes having at least one of a known composition, structure and concentration;

b) collecting a plurality of spatially-resolved spectra for said plurality of analytes;

c) producing a plurality of chemical images of said sample containing said plurality of anayltes; and

d) processing said plurality of chemical images to generate a chemical image of said sample.

20. The method of claim 19 wherein said processing step comprises at least one of:

a) correcting the image by dividing a near infrared image of said sample by a near infrared image of a background of said image to produce a resulting ratioed image ;

b) normalizing the divided image by dividing each intensity value at every pixel in the image by the vector norm for its corresponding pixel spectrum, said vector norm being the square root of the sum of the squares of pixel intensity values for each pixel spectrum;

c) processing said image using a cosine correlation analysis method wherein each pixel spectrum is treated as a projected vector in n-dimensional space, wherein n is the number of wavelengths sampled in the image; and

d) processing said image using a principal component analysis method wherein a least squares fit is drawn through the maximum variance in the n-dimensional dataset.